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EXAMINER	
MILLER, PATRICK L	
ART UNIT	**PAPER NUMBER**
2837	

DATE MAILED: 08/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

SP

Office Action Summary	Application No. 10/629,402	Applicant(s) TANNER, BRIAN K.	
	Examiner Patrick Miller	Art Unit 2837	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 May 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4,7-16,18 and 25-35* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *25-34* is/are allowed.

6)☒ Claim(s) *1-4,7-16,18 and 35* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 July 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 8-11 are objected to because of the following informalities: see bullet(s) below. Appropriate correction is required.

   - Claim 8 recites, "the measurement circuit" (lines 5-6). Lack of antecedent basis for this term. Claim 8 was amended to say a "spindle motor control circuit" instead of a "measurement circuit."

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schirle (6,055,120).

   - With respect to claim 1, Schirle disclose a method to control spin-up parameters of a spindle motor in a disk drive including the steps of: determining the spin-up parameters of the spindle motor based on a temperature of the VCM (Fig. 2, #28; Fig. 3, #71; col. 4, ll. 35-65; detected temperature "sets" a time-out period; the processor determines the spin-up parameter, speed, based on the set time-out period, and the speed parameter is determined by the voltage across the motor (voltage parameter) during spin-up to "normal" speed (Fig. 2, #28; Fig. 3, #71; col. 4, ll. 35-65); determining a temperature of a voice coil motor (VCM) (Fig. 2, #28; Fig. 3, #71; col. 4, ll. 35-65; ambient temperature

includes the temperature of the VCM); varying the spin-up parameters of the spindle motor based on the determined temperature (During spin-up, the controller drives with control signals. These signals are interpreted as voltage and/or current signals, and are labeled by the examiner as the spin-up parameters. When the temperature of the VCM gets too high, the controller shuts down the drive motor. See col. 5, ll. 12-13. This means that the voltage/current spin-up parameter is varied from a non-zero value to a zero value); and the spin-up parameters comprise at least one of: spin-up current, spin-up voltage, and commutation time (col. 3, ll. 49-52; control signals include drive voltage/current, and are interpreted as spin-up parameters).

- Schirle does not explicitly disclose determining the temperature of the VCM. However, it would have been obvious to one having ordinary skill in the art at the time of the invention that since the VCM emits heat, the ambient temperature sensed by the temperature sensor is comprised, in part, of the temperature of the VCM. Additionally, Schirle does not disclose the parameters are either spin-up voltage or current, respectively. However, Schirle does disclose a voltage sensor that detects the voltage across the motor (col. 5, ll. 1-4). This implies that the control signal must be a voltage or a current signal to set a voltage across the motor. Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention that the control signals that control the spindle motor during spin-up in the device of Schirle would be voltage and/or current signals, which are interpreted as spin-up parameters by the examiner. The motivation to use current or voltage signals as spin-up parameters is to control the speed of the spindle motor, and, thus, control the speed at which the disk rotates.

- With respect to claim 7, Schirle discloses the step of setting a time out period after which the spindle motor is turned off if it has not reached a desired operational velocity (cols. 4/5, ll. 66-67/1-13), wherein the time out period is increased with a decrease in the temperature (col. 4, ll. 31-34; increased time-out period when the temperature is low).

3. Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schirle (6,055,120) as applied to claim 1 above, and further in view of Wallis (5,268,804).

- Schirle does not disclose a step for determining the temperature comprises measuring the resistance of the coil.
- Wallis discloses determining the temperature of the VCM based on the resistance of a coil of the VCM (col. 4, ll. 47-63; Fig. 1, 'VCM Temperature' is sent to #4, which is a processor. Wallis measures the temperature of the VCM as described to increase the time taken to move the data head between given positions if the temperature of the VCM is above a predetermined value (abstract). This provides the advantage of reducing the heat built up in the mechanism moving the data without reducing the access time (cols. ½, ll. 63-68/1-5).
- Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention that the measurement circuit used to measure the resistance of a coil of the VCM to determine the temperature of the VCM could replace the temperature sensor of Schirle, thereby increasing the time taken to move the data head (of Schirle) between given positions, and providing the advantage of reducing the built-up heat in the mechanism moving the data without reducing the data access time, as taught by Wallis.

4. Claims 8-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schirle (6,055,120) in view of Wallis (5,268,804).

- Schirle discloses a hard disk drive comprising (Fig. 1): a voice coil motor (VCM) having a coil winding (Fig. 2, #27; col. 3, ll. 21-33); a spindle motor (Fig. 2, #21); a spindle motor control circuit coupled to the VCM to measure the temperature of the VCM and provide a temperature estimate (Fig. 2, #28 controls both the VCM and the SPM and the temperature sensor #50 measures the ambient temperature, which is comprised of the VCM temperature); and the measurement circuit providing a signal to vary the rate of spin-up for the spindle motor based on the temperature estimate (When the temperature of the VCM gets too high, the controller shuts down the drive motor. See col. 5, ll. 12-13. This is interpreted as varying the rate of the spindle motor from a non-zero value to a zero value).
- Schirle does not explicitly disclose determining the temperature of the VCM. However, it would have been obvious to one having ordinary skill in the art at the time of the invention that since the VCM emits heat, the ambient temperature sensed by the temperature sensor is comprised, in part, of the temperature of the VCM.
- Additionally, Schirle does not disclose the temperature estimate being based on the measured resistance of the VCM.
- Wallis discloses determining the temperature of the VCM based on the resistance of a coil of the VCM (col. 4, ll. 47-63; Fig. 1, 'VCM Temperature' is sent to #4, which is a processor. Wallis measures the temperature of the VCM as described to increase the time taken to move the data head between given positions if the temperature of the VCM is

above a predetermined value (abstract). This provides the advantage of reducing the heat built up in the mechanism moving the data without reducing the access time (cols. ½, ll. 63-68/1-5).

- Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention that the measurement circuit used to measure the resistance of a coil of the VCM to determine the temperature of the VCM could replace the temperature sensor of Schirle, thereby increasing the time taken to move the data head (of Schirle) between given positions, and providing the advantage of reducing the built-up heat in the mechanism moving the data without reducing the data access time, as taught by Wallis.
- With respect to claim 9, Schirle discloses increasing a time for the spin-up of the spindle motor to reach an operating spin-rate with a decrease in the temperature estimate (col. 4, ll. 31-34; increase time-out period when the temperature is low).
- With respect to claim 10, Schirle discloses turning off the spindle motor if the spindle motor speed has not reached an operating spin-rate after a period of time, and the period of time is increased with a decrease in the temperature estimate (col. 5, ll. 1-13; col. 4, ll. 47-50).
- With respect to claim 11, Schirle discloses controlling the spin-up time and the spin-up voltage (col. 4, ll. 35-65; detected temperature "sets" a time-out period (spin-up time); the processor determines the spin-up parameter, speed, based on the set time-out period, and the speed parameter is determined by the voltage across the motor (voltage parameter) during spin-up to "normal" speed). Also note that the controller controls the current and voltage to the spindle motor when it drives the spindle motor toward a "normal" speed

and also when it shuts down the drive motor (controls current and voltage by turning off power to the motor) (col. 5, ll. 1-13).

5. Claims 12-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schirle (6,055,120) in view of Wallis (5,268,804).

- Schirle discloses a means for determining a temperature of the VCM (Fig. 2, #28; Fig. 3, #71; col. 4, ll. 35-65; ambient temperature includes the temperature of the VCM); and a means for sending a signal to vary spin-up parameters for the spindle motor based on the temperature of the VCM, where the spin-up parameters comprise at least one of the following: spin-up current, spin-up voltage, and commutation time (During spin-up, the controller drives with control signals. These signals are interpreted as voltage and/or current signals, and are labeled by the examiner as the spin-up parameters. When the temperature of the VCM gets too high, the controller sends a signal to shut down the drive motor. See col. 5, ll. 12-13. This means that the voltage/current spin-up parameter is varied from a non-zero value to a zero value).
- Schirle does not disclose a means for determining a temperature of the VCM, wherein said means comprises a measurement circuit coupled to a coil winding of the VCM to measure the resistance of the coil to determine temperature. Also note that the Examiner has looked to the specification to determine the Applicant's means and its equivalents under 112 (6^{th}).
- Wallis discloses determining the temperature of the VCM based on the resistance of a coil of the VCM (col. 4, ll. 47-63; Fig. 1, 'VCM Temperature' is sent to #4, which is a processor. Wallis measures the temperature of the VCM as described to increase the time

taken to move the data head between given positions if the temperature of the VCM is above a predetermined value (abstract). This provides the advantage of reducing the heat built up in the mechanism moving the data without reducing the access time (cols. ½, ll. 63-68/1-5).

- Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention that the measurement circuit used to measure the resistance of a coil of the VCM to determine the temperature of the VCM could replace the temperature sensor of Schirle, thereby increasing the time taken to move the data head (of Schirle) between given positions, and providing the advantage of reducing the built-up heat in the mechanism moving the data without reducing the data access time, as taught by Wallis.
- With respect to claims 13 and 14, Wallis discloses the means for determining temperature comprises a processor, which is also a temperature measuring circuit, coupled to a coil winding of the VCM to measure resistance of the coil (col. 4, ll. 47-63).
- With respect to claim 15, Schirle discloses the means for determining spin-up parameters comprises a spindle motor controller (Fig. 2, #28).
- With respect to claim 16, Schirle discloses the means for determining spin-up parameters comprises a processor which provides control code to a spindle motor controller (col. 4, ll. 50-59; internally the controller comprises a processor and a spindle motor controller; the controller 28 has a processor that uses the information in the lookup table to control the output to the spindle driver).
- With respect to claim 18, Schirle discloses a means for turning off the spindle motor if the spindle motor speed has not reached an operating spin-rate after a period of time, and

wherein the period of time is increased with a decrease in the temperature of the VCM (cols. 4/5, ll. 66-67/1013; col. 4, ll. 47-50).

6. Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schirle (6,055,120) in view of Wallis (5,268,804).

- Schirle discloses a disk driver comprising: a rotatable disk, a transducer, and an actuator that supports the transducer (Figs. 1 & 2); a VCM connected to the actuator, the VCM including a coil winding configured to receive a signal to move the actuator so that the transducer is moved relative to the disk (Fig. 2, #32 to #27); a processor coupled to the VCM to apply a signal to measure the temperature of the VCM (Fig. 2, #28 receives signal from #50, which is the ambient temperature, which includes the temperature of the VCM); a spindle motor having a plurality of coil windings and a rotor rotatable at an operating spin-rate during an operation mode of the disk drive (Fig. 2, #21; col. 2/3, ll. 67/1-20); and a spindle motor control means for receiving the temperature estimate from the processor and for providing a signal to the coil windings to vary the spin-rate of the spindle motor during startup based on the temperature estimate (When the temperature of the VCM gets too high, the controller shuts down the drive motor. See col. 5, ll. 12-13. This is interpreted as varying the rate of the spindle motor from a non-zero value to a zero value).
- Schirle does not explicitly disclose determining the temperature of the VCM. However, it would have been obvious to one having ordinary skill in the art at the time of the invention that since the VCM emits heat, the ambient temperature sensed by the temperature sensor is comprised, in part, of the temperature of the VCM.

- Additionally, Schirle does not disclose the temperature estimate being based on the measured resistance of the VCM.
- Wallis discloses determining the temperature of the VCM based on the resistance of a coil of the VCM (col. 4, ll. 47-63; Fig. 1, 'VCM Temperature' is sent to #4, which is a processor. Wallis measures the temperature of the VCM as described to increase the time taken to move the data head between given positions if the temperature of the VCM is above a predetermined value (abstract). This provides the advantage of reducing the heat built up in the mechanism moving the data without reducing the access time (cols. ½, ll. 63-68/1-5).
- Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention that the measurement circuit used to measure the resistance of a coil of the VCM to determine the temperature of the VCM could replace the temperature sensor of Schirle, thereby increasing the time taken to move the data head (of Schirle) between given positions, and providing the advantage of reducing the built-up heat in the mechanism moving the data without reducing the data access time, as taught by Wallis.

Allowable Subject Matter

7. Claims 25-34 are allowed.
   - With respect to claim 25, the Prior Art discloses causing the current applied to a spindle motor to increase torque during startup; however, the Prior Art does not disclose increasing torque at startup to correspond to the decrease in the temperature estimate.
   - With respect to claim 26, the Prior Art does not disclose a controller that provides a series of commutation clock pulses to advance a spindle motor driver between commutation

states, and wherein the controller controls commutation clock pulses to increase the torque applied to the spindle motor during startup corresponding to the decrease in the temperature estimate provided by the processor.

- With respect to claim 32, the Prior Art discloses causing the current applied to a spindle motor to increase torque during startup; however, the Prior Art does not disclose increasing the torque at startup to correspond to the decrease in the temperature estimate.
- With respect to claim 34, the Prior Art does not disclose providing a series of commutation clock pulses to advance the spindle motor driver between commutation states, and wherein the spindle motor controller controls timing of the commutation clock pulses to increase the torque applied during startup corresponding to a decrease in the temperature estimate.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patrick Miller whose telephone number is 571-272-2070. The examiner can normally be reached on M-F, 8:30-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Martin can be reached on 571-272-2800 ext 41. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9318.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-3431.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Patrick Miller
Examiner
Art Unit 2837

pm
July 27, 2005

MARLON T. FLETCHER
PRIMARY EXAMINER